

Witness The ARCTIC

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University of Arctic (UArctic)—20 Years of Cooperation in Education, Research, and Knowledge Sharing

The University of the Arctic (UArctic) (<https://www.uarctic.org/about-uarctic/>) is a network of over 230 universities, colleges, research institutes, and other organizations concerned with education and research in and about the North. UArctic builds and strengthens collective resources and infrastructures that enable member institutions to better serve their constituents and their regions. Through cooperation in education, research, and outreach UArctic enhances human capacity in the North, promotes viable communities and sustainable economies, and forges global partnerships.



Figure 1. Introductory slide, "Who We Are," courtesy of the UArctic General Presentation Slideshow.

Created by the Arctic Council through the Iqaluit Declaration in 1998 ([Download PDF-354 KB](https://oaarchive.arctic-council.org/handle/11374/86)) (<https://oaarchive.arctic-council.org/handle/11374/86>), and launched 20 years ago in 2001, UArctic is committed to upholding its principles of sustainable development as well as the United Nations [Sustainable Development Goals](https://sdgs.un.org/goals) (<https://sdgs.un.org/goals>). UArctic is constituted as an international association based in Finland. UArctic works in close partnership with other Arctic organizations such as the International Arctic Science Committee ([IASC](https://iasc.info/)) (<https://iasc.info/>), the [International Arctic Social Sciences Association \(IASSA\)](https://iassa.org/) (<https://iassa.org/>), and the [Association of Polar Early Career Scientists \(APECS\)](https://www.apecs.is/) (<https://www.apecs.is/>), and is an observer to the [Arctic Council](https://arctic-council.org/en/) (<https://arctic-council.org/en/>).



Figure 2. UArctic Thematic Networks slide, courtesy of the UArctic General Presentation Slideshow.

UArctic supports the cooperation and collaboration among its members via [Thematic Networks and UArctic Institutes](https://www.uarctic.org/organization/thematic-networks/) (<https://www.uarctic.org/organization/thematic-networks/>). The thematically focused networks address topical Arctic issues and problems, creating joint education and research, and sharing the knowledge. Currently, there are 66 Thematic Networks and UArctic Institutes, with some also led from countries outside the [eight Arctic States](https://arctic-council.org/en/about/states/) (<https://arctic-council.org/en/about/states/>). Seven new Thematic Networks were endorsed after an annual call in the last assembly of UArctic meeting in May 2021. The [seven new Thematic Networks](https://www.uarctic.org/news/2021/5/uarctic-welcomes-seven-new-thematic-networks) (<https://www.uarctic.org/news/2021/5/uarctic-welcomes-seven-new-thematic-networks>) are:

- Thematic Network on Arctic Indigenous Film, hosted by International Sámi Film Institute ISFI, Norway
 - Thematic Network on Arctic Space Hub, hosted by Sodankylä Geophysical Observatory, University of Oulu, Finland
 - Thematic Network on Arctic Urban Planning and Design, hosted by The Arctic University of Norway, Norway (UiT)
 - Thematic Network on Bioregional Planning for Resilient Rural Communities, hosted by University of New England, United States of America
 - Thematic Network on Circular Economy, hosted by Lapland University of Applied Sciences, Finland
 - Thematic Network on Children in the Arctic, hosted by Ilisimatusarfik / University of Greenland, Greenland
 - Thematic Network on Critical Arctic Studies, hosted by Arctic Centre, University of Lapland, Finland
- Find out more about UArctic, the Circumpolar North, and current issues facing the region through video interviews with UArctic leaders, Thematic Network Leads, members, and key partners. [View Video Interviews](https://www.uarctic.org/about-uarctic/video-interviews) (<https://www.uarctic.org/about-uarctic/video-interviews>)

Thematic Networks form a backbone to activities conducted in UArctic and this year marks the 10th Anniversary of the [Arctic Yearbook](https://arcticyearbook.com/) (<https://arcticyearbook.com/>), an annual Arctic peer-reviewed volume of scholarly articles created and edited by the Thematic Network on Geopolitics and Security. The Arctic Yearbook is one example of many publications,

books, and edited volumes co-authored by various Thematic Networks.

Thematic Networks and UArctic Institutes are independent and different in many ways, in their size, diversity, geographical region, focus and aims. Some networks focus on Indigenous languages or teacher education, building the resilience and capacity of communities. Some focus on pure physical climate sciences, and some work and do exhibitions on arts and design. Networks also collaborate with each other, participate in Arctic Council working groups and projects, and engage with the whole UArctic community.

One great example of engaging with youth and Arctic community is the Thematic Network on Arctic Arts and Design's UArctic Photo Competition: Arctic Polarities. The first competition was open in 2020 and currently the competition is open for contributions to [Arctic Polarities 2022](https://www.uarctic.org/news/2021/6/the-uarctic-photo-competition-arctic-polarities-2022) (<https://www.uarctic.org/news/2021/6/the-uarctic-photo-competition-arctic-polarities-2022>).



Figure 3. The winning photo, "Whale" in the Arctic Polarities 2021 competition in the staff category by Thomas Chung.


UArctic promotes and works for equal educational opportunities for everyone in the North. One of the first activities started in the early years of UArctic is the Bachelor level Circumpolar Studies courses aimed to increase the awareness of the Arctic as a whole. Today the courses can still be taken, also as a classroom course in some of the UArctic member organizations. Parallel to Circumpolar Studies, a mobility program [north2north](https://www.uarctic.org/news/2006/2/north2north) (<https://www.uarctic.org/news/2006/2/north2north>) was initiated, offering exchange to students from one UArctic member university to another. COVID-19 cannot be forgotten in this context as physical mobility has not been possible during the past year. To overcome the related challenges, new ways of mobility have been planned, particularly as virtual mobility. COVID-19 was challenging of course to all networking activities; however, the online meetings and webinars have proved to be an equal and cost-efficient way to meet partners more frequently and to organize online education.

north2north
Student Mobility

Student exchange program that allows students at UArctic institutions to visit different northern regions, and share experiences face-to-face, through study at other UArctic institutions.

I enrolled in the north2north program to broaden my knowledge in a different culture and on different subjects than I was studying in Canada. This experience caused me to rethink my career, where I was going to live, and what I was going to do with my life.

Shawn Jantzen
University of Saskatchewan

 **UArctic**

www.uarctic.org

Figure 4. Informational slide, "north2north," courtesy of the UArctic General Presentation Slideshow.

UArctic Congress 2020 (<https://congress.uarctic.org/>) had also to be first postponed from October 2020 to May 2021 and later on changed to an online Congress. It still attracted almost 600 registered participants who followed 40 online parallel sessions and plenaries. Connectivity is still an issue in many rural Arctic communities and until internet connections are secured for everyone seeking education, or accessing health care, etc., the Arctic is not an equal place to all. The UArctic Congress 2021 Declaration states:

“Online meetings provide more equal access to everyone to attend the meetings and conferences—if broadband internet connectivity is available. Connectivity and accessibility, in the broad sense, have thus become even more important key needs for northern communities. Online connectivity must improve to allow equal participation by northerners in meetings, conferences, and other activities important to livelihoods and sustainability.”

The UArctic Thematic Network on Arctic Telecommunications and Networking is looking for solutions to overcome the challenge of connectivity. In collaboration with Thematic Networks, the work towards sustainable futures and resilience for better education and building the future leaders is a high priority. UArctic aims in a joint effort in partnership with other Arctic organizations to build an Arctic as home, which can adapt to challenges faced by climate change and globalization in a sustainable way.



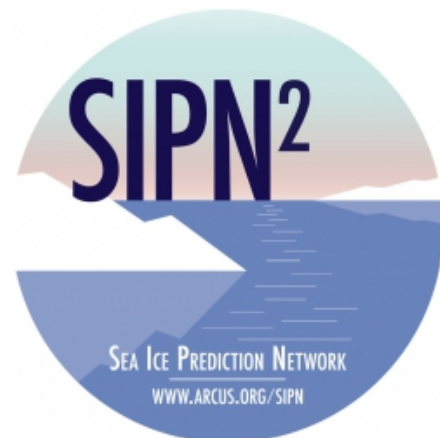
Figure 5. To learn more about UArctic slide, courtesy of the UArctic General Presentation Slideshow.

The UArctic General Presentation Slideshow is available on the [UArctic website](https://www.uarctic.org/about-uarctic) (<https://www.uarctic.org/about-uarctic>).

For further information or questions, please contact Kirsi Latola - Vice-President Networks (Kirsi.Latola@oulu.fi) or the UArctic International Secretary (secretariat@uarctic.org).

SIPN2 News

The Sea Ice Prediction Network–Phase 2 ([SIPN2](https://www.arcus.org/sipn)) is a network of US and international members working to advance research on the processes driving sea-ice predictability, prediction products, and the communication of findings to interested stakeholders. SIPN2 is funded by NSF–Arctic Sciences Section and the UK Natural Environment Research Council ([NERC](https://nerc.ukri.org/)), [with several collaborators and partners](https://www.arcus.org/sipn/project-team).



The Sea Ice Outlook ([SIO](https://www.arcus.org/sipn/sea-ice-outlook)) provides an open process for those interested in Arctic sea ice to share ideas and predictions for Arctic ice extent, sea-ice probability, ice-free date, and other variables. In 2021, the SIO will produce monthly reports in June, July, August, and September that contain a variety of perspectives on Arctic sea ice—from observations of current conditions, to advanced numerical models, to qualitative perspectives from citizen scientists. A post-season interim and/or final report will be developed after the sea-ice retreat season has concluded

For the 2021 [June](https://www.arcus.org/sipn/sea-ice-outlook/2021/june) report, 38 contributions were received that included pan-Arctic predictions. Of those contributions, eight also included predictions for pan-Antarctic, seven included predictions for the Alaska Region, and 14 submitted September mean sea-ice extent anomalies. This report includes new discussions on Arctic sea-ice extent anomalies, SIO contributor motivations, and the emerging pattern in the Sea Ice Outlooks. For the pan-Arctic, the median June Outlook value for September 2021 sea-ice extent is 4.37 million square kilometers, with quartiles of 4.07 and 4.61 million square kilometers. The median is close to the 2020 June Outlook, of 4.33 million square kilometers.

The [SIPN2 Project Team](https://www.arcus.org/sipn/project-team) hosted a virtual forum on 21 and 22 January 2021 for SIO Contributors to share information about sea-ice forecast methods, discuss related challenges, and identify activities and products that could advance forecasting skill. Participation was by invitation only and limited to individuals who recently submitted forecasts to the SIO. Sessions were held in the morning (Pacific time) on both days, and in the evening on the first day (Pacific time) to facilitate participation with colleagues in both European and east Asian time zones. The meeting included a mix of pre-recorded presentations, plenary and lightning talks, and breakout group discussions. Participants shared and discussed successes and challenges in Arctic and Antarctic sea-ice prediction, identified future activities to improve seasonal prediction, and recommended future collaboration and networking activities.

The [SIPN2 Project Team](https://www.arcus.org/sipn/project-team) will host a webinar entitled, "Prospects for Improved Regional Predictions of Arctic Sea Ice," on 13 July 2021. Presented by Mitch Bushuk, this webinar will provide an overview of a newly developed dynamical seasonal prediction system and its performance in predicting regional Arctic sea-ice conditions. For further information and to register, see: [Prospects for Improved Regional Predictions of Arctic Sea Ice](#).

What do US Students Know about the Polar Regions?

By: Stephanie Pfirman, Julie Ann Wrigley Global Institute of Sustainability and Innovation, Arizona State University; Lawrence Hamilton, Carsey School of Public Policy, University of New Hampshire; Margie Turrin, Lamont-Doherty Earth Observatory, Columbia University; Craig Narveson, Director of Strategic Partnerships at Kahoot!, Oslo, Norway; Carrie A. Lloyd, Arizona State University

The question, "What do US Students Know about the Polar Regions?" is an important one for us to figure out so that we can develop educational priorities to prepare the future workforce. Newly released findings that the Arctic near-surface air temperature is warming at rates of three times that of the global average (AMAP, 2021), further elevate the importance of educating our next generation of decision makers. While we can survey adults, it is harder to develop research protocols to gather a nationwide sample of students. With support from the National Science Foundation and Arizona State University, we developed the novel approach of analyzing student responses to online quizzes posted on the popular Kahoot! platform (Pfirman et al., 2021). Partners in the project include Barnard College, Lamont-Doherty Earth Observatory of Columbia University, the University of New Hampshire, Arizona State University, and Kahoot!.

Through the Polar Learning and Responding Climate Change Education Partnership, we had created a polar quiz as part of a series of "[Climate Challenges](https://tinyurl.com/PolarClimateKahoot)" (<https://tinyurl.com/PolarClimateKahoot>) for education and engagement. While the questions were not ideally designed for evaluation, the quiz attracted a large number of players (134,000 as of June 2021), across a wide geographic area. We filtered the data for responses from US teacher-hosted games, and analyzed the aggregate data. Over the nine-month period analyzed (September 2018 through June 2019), there were more than 1,000 unique US teacher hosts (based on the number of unique IP addresses) of the polar Kahoot!. At least three teachers hosted the quiz in each of the 50 US states and Washington, DC. This shows that US teachers are interested in including polar content in their classrooms. Furthermore, more than 25,000 of the respondents to the first question were US middle and high school students.

Because the first three quiz questions were adapted from questions asked of adults in a 2016 survey (Hamilton 2016, 2018; Hamilton et al. 2017), we could assess relative student knowledge. The average score of US students on these questions was 30% (SD = 06), much lower than the 49% average accuracy found in the US adult survey (SD = .18). Each of the questions had four multiple choice answers, so random choice would give a score of 25%, indicating that many of the US student Kahoot! players were guessing in their responses to the polar questions.

The Kahoot! game-based player response system records which state each response comes from, so we can get a glimpse of regional variations in student polar knowledge. We say a glimpse, because only thirteen states had enough responses to analyze. Rhode Island, Oregon, Arizona, and Washington demonstrated the highest levels of student polar knowledge, with average accuracies ranging from 53-50% (Rhode Island to Washington), SD 0.13-0.09. New York, Florida, Arkansas, Michigan, Texas, and Indiana had intermediate accuracies ranging from 45-41%, SD 0.12-0.05. California had an average accuracy of 35%, but the pattern was highly variable with the largest standard deviation of the 13 states analyzed at 0.16. The average accuracies of student responses in Ohio and Illinois were the lowest at 27% and 28%, SD 0.01 and 0.02, respectively, reflecting a high degree of guessing. Because this was an exploratory analysis, we do not yet know the reasons for these regional differences.

Now that we have this suite of questions along with benchmark scores, they can be used to understand the impact of polar educational interventions by offering them pre- and/or post-activity. The Kahoot! platform is free for educators to use and develop their own Kahoot!s to support both live learning sessions and asynchronous challenges with students. It would be terrific if others would create additional Kahoot! quizzes tag them within the Kahoot! description area with #polar to build out a searchable community inventory of polar questions.

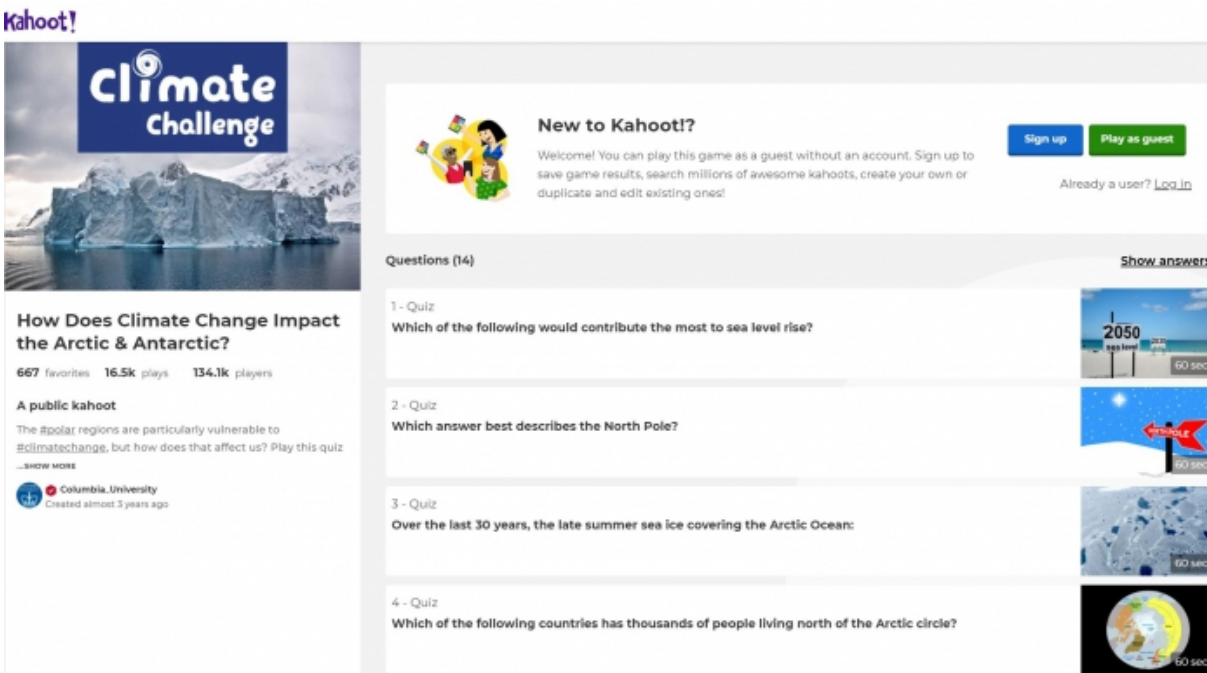


Figure 1. Screenshot of the first four questions in the polar Kahoot! of the Climate Challenge (Turrin et al., 2019). Each question has an accompanying image. Sometimes the image provides information relevant to answering the question. Answers are hidden in this image.

Editor's note: Screen shot above is from the [Kahoot! website](https://create.kahoot.it/details/how-does-climate-change-impact-the-arctic-antarctic/a15b0685-fdec-4405-9caa-1503dcadd022?deviceId=a4147ba0-58ff-4780-a098-58e964707a57R&sessionId=1605568343584&deviceId=a4147ba0-58ff-4780-a098-58e964707a57R&sessionId=1605568343584&_ga=2.165746430.1313820529.1605544809-1326155410.1516384635&deviceId=a4147ba0-58ff-4780-a098-58e964707a57R&sessionId=1605568343584) (https://create.kahoot.it/details/how-does-climate-change-impact-the-arctic-antarctic/a15b0685-fdec-4405-9caa-1503dcadd022?deviceId=a4147ba0-58ff-4780-a098-58e964707a57R&sessionId=1605568343584&deviceId=a4147ba0-58ff-4780-a098-58e964707a57R&sessionId=1605568343584&_ga=2.165746430.1313820529.1605544809-1326155410.1516384635&deviceId=a4147ba0-58ff-4780-a098-58e964707a57R&sessionId=1605568343584).

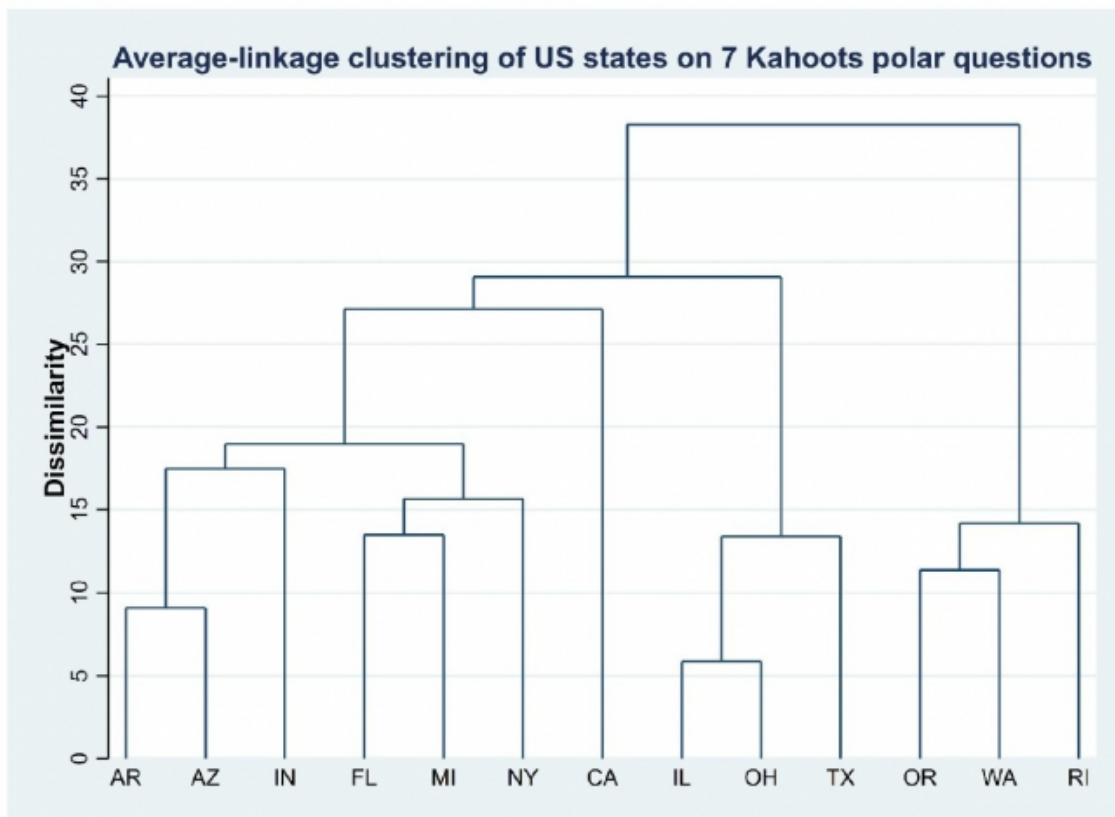


Figure 2. Results from cluster analysis of the 13 US states with enough responses to analyze. Grouping is according to similarities in patterns of accuracy across analyzed questions. The vertical axis represents the average dissimilarity distinguishing states or groups of states. For example, 0 would be identical patterns and 100 would indicate maximum dissimilarity. Figure courtesy of Pfirman et al., 2021.

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The Arctic Council and Gender Equality – A Milestone Report on Gender Equality in the Arctic Published

By: Embla Eir Oddsdóttir, Icelandic Arctic Cooperation Network Director and Hjalti Ómar Ágústsson, Gender Equality in the Arctic Project, Phase III, Project Manager

On 21 May 2021, a milestone [Pan-Arctic Report: Gender Equality in the Arctic](#)

(<https://arcticgenderequality.network/phase-3/pan-arctic-report>) has been published and is

available online as a PDF (Figure 1). The report was published in tandem with the Arctic Council (AC) Ministerial Meeting held in Reykjavík 19–20 May. Gender equality has been one of Iceland’s priorities during its AC Chairmanship 2019–2021, under the theme People and Communities, and the report is a product of the Icelandic chairmanship. The report is a part of an international collaborative project under the AC Sustainable Development Group (SDWG) (<https://sdwg.org/>) on Gender Equality in the Arctic (GEA) (<https://arcticgenderequality.network/>) dating back to 2013. Lead and co-leads include: Iceland, Sweden, Finland, Canada, the United States, the Saami Council, the Aleut International Association and a host of other partners. Initiated by the Ministry for Foreign Affairs in Iceland, in collaboration with the Directorate for Equality in Iceland and the Stefansson Arctic Institute, the project has been led by the Icelandic Arctic Cooperation Network (IACN) under the leadership of its director Embla Eir Oddsdóttir, and the GEA Team in Akureyri, Iceland.





Figure 1. The Pan-Arctic Report: Gender Equality in the Arctic.

From the beginning, the purpose and objective of the GEA project has been to raise visibility and understanding of the importance of gender issues in the Arctic, to identify priorities and concrete strategies for increased diversity and gender balance in policy and decision-making processes, and to provide information to facilitate sustainable policy making for the future. More information on GEA project can be found on the [project website](https://arcticgenderequality.network/project-background) (<https://arcticgenderequality.network/project-background>).

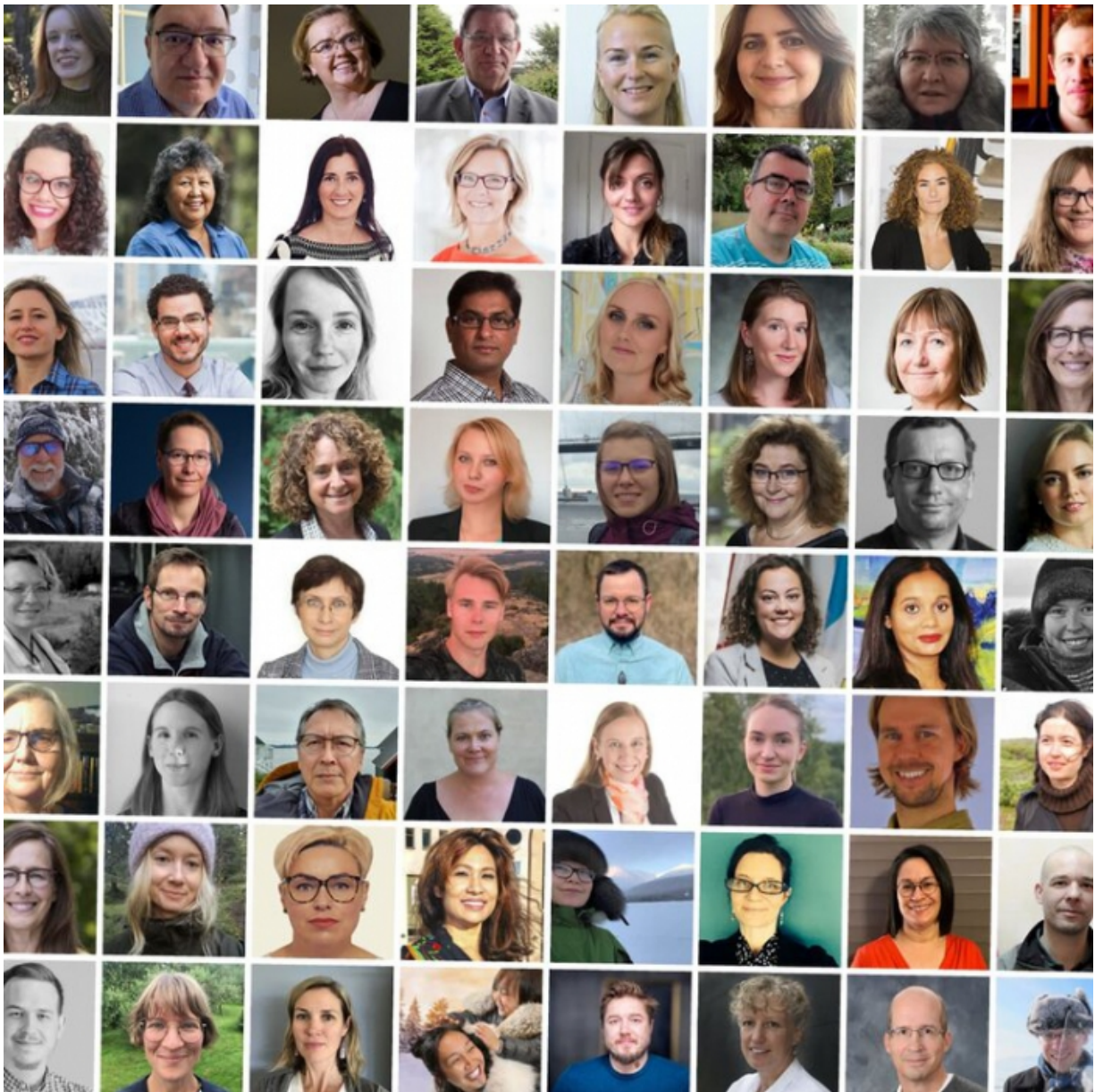


Figure 2. Photo Collage of some of the authors and contributors of the Pan-Arctic Report: Gender Equality in the Arctic. Image courtesy of the Gender Equality in the Arctic project.

The report was developed by 10 lead authors and approximately 80 contributing authors, from over 15 states, including all Arctic States (Figure 2). (See: [Pan-Arctic Report Acknowledgements](https://arcticgenderequality.network/phase-3/pan-arctic-report/acknowledgements) (<https://arcticgenderequality.network/phase-3/pan-arctic-report/acknowledgements>)). In the spirit of the GEA project, a vital component of developing the report was the engagement process and significant efforts were made to ensure inclusion and transparency during the process by actively soliciting feedback from peers and interested parties. A special emphasis was on the partnership with AC Permanent Participants and other Indigenous representatives, both through project partners, the Editorial Committee, the Youth Advisory Group, the SDWG Social, Economic and Cultural Expert Group, and through contributions to chapters from Indigenous experts, including from the Saami Council, the Aleut International Association, and the Arctic Athabaskan Council, as well as the Paktuutit Inuit Women of Canada.

Indeed, the key lessons learned in the collaborative process was that for meaningful youth and Indigenous participation, they must be involved from the incipient stages of projects and funding for their participation must be built into proposals. Another important lesson learned was that adequate time must be available for the compilation of extensive work like the report, which suffered a bit from a very narrow window for completion, in addition to COVID-19 effects.

The report provides an overview of gender-related issues in the Arctic presented in six thematic chapters:

- Law & Governance (chapter 1) examines formal obligations regarding gender equality in the public governance of the Arctic region, as expressed in political and legal documents, including special consideration of Indigenous Peoples.
- Security (chapter 2) examines the impacts of inequalities in the Arctic through a security lens and identifies trends in insecurity.
- Gender and Environment (chapter 3) provides an overview of the gendered dimensions of issues connected to the broadly understood environment of the Arctic region, including climate, oceans, land, biodiversity, natural resources, and waste and pollution.
- Migration and Mobility (chapter 4) discusses how migration and mobility in the Arctic are constructed through gender and why an understanding of migration and mobility requires a gendered approach.
- Indigeneity, Gender, Violence, and Reconciliation (chapter 5) seeks to take a step towards mapping the complex relations amongst violence; gender; the social, economic, political, and legal systems; human health and well-being; culture; and identities.
- Empowerment and Fate Control (chapter 6) seeks to identify concrete strategies for political, economic, and civic gender empowerment in order to facilitate sustainable policy making for the Arctic.

Key findings include the need for mainstreaming and gender-based analysis as necessary strategies for promoting and ensuring gender equality, including in social and economic development, and the need for better gender, sex, and ethnically disaggregated data. Consistent and comparable data is the very foundation for understanding realities and inequalities across regions, countries, sectors, genders, and peoples. It is crucial for meaningful research and providing policy makers and decision makers with the knowledge and capacity to develop well-informed policies. The highlights are relevant for multiple audiences, including Arctic states, the AC and its working groups, policy makers, private industry, the research community, and the public.

For further information and biographical statements of lead authors and contributing authors of the Pan-Arctic Report on Gender Equality in the Arctic, please see [here](https://arcticgenderequality.network/phase-3/pan-arctic-report) (<https://arcticgenderequality.network/phase-3/pan-arctic-report>)

About the Authors



Embla Eir Oddsdottir is the Director of the Icelandic Arctic Cooperation Network (IACN) and the Polar Law Institute in Akureyri, Iceland. Embla represents Iceland in the Arctic Council, Sustainable Development Working Group's Social, Economic, and Cultural Expert Group (SECEG) and is project lead of the SDWG project Gender Equality in the Arctic, an Arctic Council Icelandic Chairmanship project 2019–2021. Embla is a member of the European Polar Board, a Council

Member of the International Arctic Social Association (IASSA), and Chair of the Icelandic Joint Committee of Arctic Affairs. Embla represented Iceland in the Arctic Science Ministerial III (ASMIII) Science Advisory Board, co-organized by Iceland and Japan in 2021. Embla has experience in research, project management, and international and multi-stakeholder collaboration on policy relevant issues in the Arctic. Embla's educational background is interdisciplinary, and includes socio-economic development, anthropology, cultural geography, international relations, international law, and Indigenous studies. Embla holds a MSc in law, anthropology, and society from the London School of Economics with

undergraduate studies on socioeconomic development at the University of Akureyri and interdisciplinary studies at the University of Northern British Columbia in Canada. Additionally, Embla has completed Diploma level courses in Polar Law at the University of Akureyri.



Hjalti Ómar Ágústsson is the project manager for the Gender Equality in the Arctic Project, Phase III and a Special Advisor at the Directorate for Equality in Iceland. He has an ML degree in law and a diploma in Polar Law from the University of Akureyri. Hjalti has been working on human rights issues since graduation in 2014 through teaching, as project manager and board member for Aflið – Counseling Centre for Sexual and Domestic abuse Survivors in Akureyri, and as a Child Protective Services Committee member before joining the Gender Equality in the Arctic Project and the

Directorate for Equality.

Supporting Data Management Early in the Research Cycle: New Directions for the Arctic Data Center

By: Jasmine Lai, Projects Data Coordinator, National Center for Ecological Analysis and Synthesis (NCEAS); Amber E. Budden, Director of Learning and Outreach, (NCEAS); Matthew B. Jones, Principal Investigator, NCEAS

Since 2016, the [Arctic Data Center](https://arcticdata.io/) (<https://arcticdata.io/>) has been supporting Arctic researchers in the discovery, access, curation, and preservation of research data, in addition to providing support, guidance, and training on data management and reproducible research practices. In those first five years of operations, the Arctic Data Center has preserved the work of over 2900 researchers in over 6400 individual datasets totaling 56 terabytes, and has become one of only 27 repositories in the US to be [CoreTrustSeal](https://www.coretrustseal.org/) (<https://www.coretrustseal.org/>) certified. Through engagement with researchers at national and international Arctic and domain-focused events, and through discussions at our reproducible research training events and Arctic conferences, we have developed an increased understanding of the data management and reuse needs of Arctic researchers that informs our focus for the next five years of operations.

As of 1 May 2021, the National Science Foundation (NSF) reaffirmed its commitment to data archiving and sharing in the Arctic by investing \$ 6 million to [continue funding](https://arcticdata.io/news/2021/05/understanding-the-arctic/) (<https://arcticdata.io/news/2021/05/understanding-the-arctic/>) of the Arctic Data Center through 2026. This continued investment will allow the Center to increase capabilities in a number of critical areas, in addition to maintaining and enhancing the current services valued across the community. We will scale our repository to support preservation of much larger, terabyte-scale datasets, which are increasingly being produced by researchers using, for example, remotely operated aircraft and automated sensor networks. In addition, we will increase the features available within our customizable data portals. The [data portals](https://arcticdata.io/data-portals/) (<https://arcticdata.io/data-portals/>) service, which was launched during the first award, enables researchers to create a custom, branded portal for their research topic or lab group that spans datasets in the Arctic Data Center.

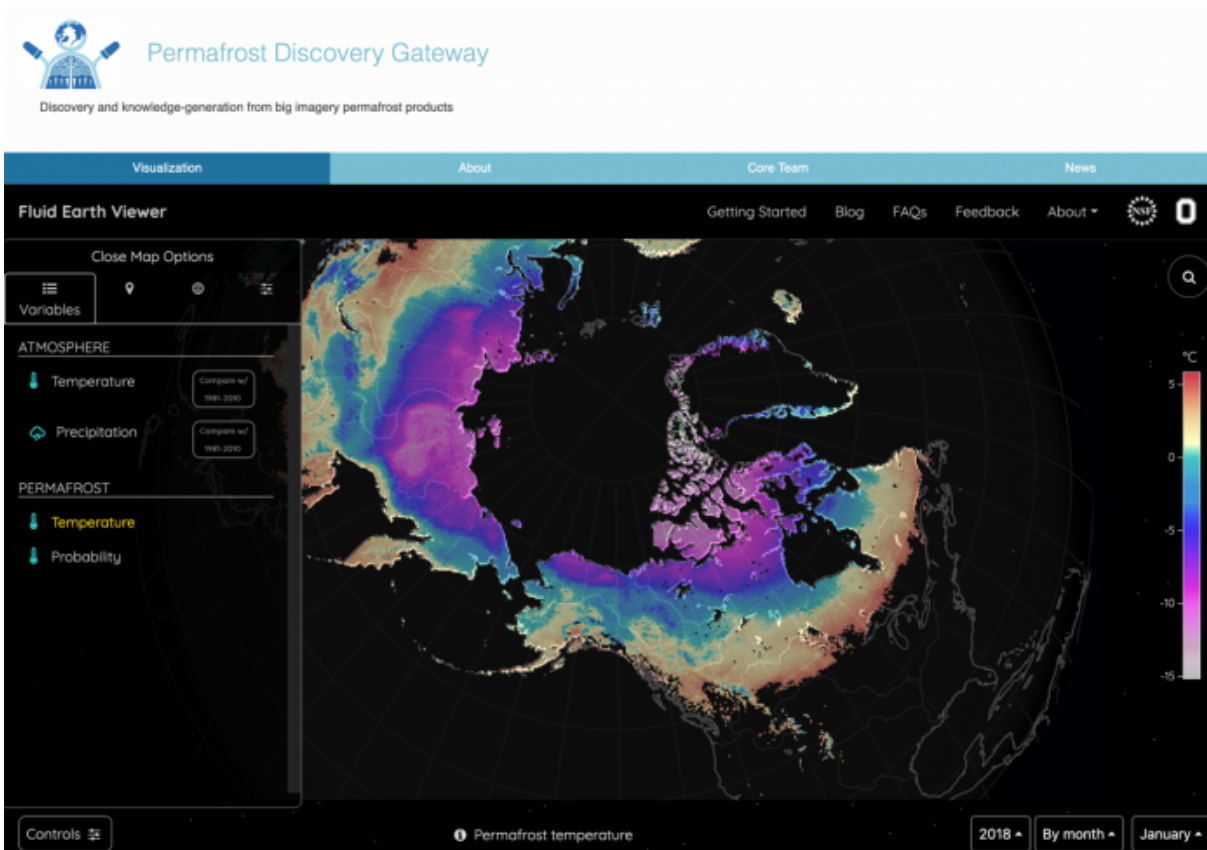


Figure 1. A custom data portal for the Navigating the New Arctic (NNA) project focused on building the Permafrost Discovery Gateway, showing an interactive global map with permafrost temperature values from Obu et al. (2019). Future versions of the portal system will support additional custom visualizations, embedded interactive maps, and embedded analysis applications.

These branded portals provide users a convenient, readily customized way to communicate their research to the broader community. Since the service launched, over 20 portals have been created and this new award will enable us to increase the capability for customization with the addition of user-created custom search queries, groups and filters to aid discovery, and the ability to embed interactive data visualizations such as shiny apps. We will also introduce new group collaboration features that enable research projects to collaborate more effectively early in their project, long before data are ready to be archived. These early life cycle features will include team-focused data sharing, streamlined data management, and new data quality assessment services.

Data reuse will drive additional new functionality for building derived data products that are useful for multiple user communities. The Arctic Data Center preserves data from a myriad of disciplines with multitudes of formats, models, and protocols of varying compatibility. While the research community downloads and uses these datasets frequently, we also recognize the need to integrate these heterogeneous data into more uniform derived products that span spatial, temporal, and project boundaries. We plan a new derived data workflow service that will enable researchers from diverse disciplines to contribute new data products that assemble existing data in useful ways for various research, community, and management uses, among others. We will then be able to maintain and extend these derived products as new data of that type are archived over time.



Katie Harrold and Adrianna Trusiak prepare for field work. Toolik Field Station, Alaska. Photo by Regina Brinker (PolarTREC 2014), Courtesy of ARCUS.

Providing first-class support for data management challenges that face the Arctic research community remains a focus, and future work will increase our emphasis on supporting data management issues for social science disciplines. Planned work includes continuing discussions with social science researchers initiated in during the first award, designing targeted social scientific resources and learning opportunities, increased representation at social science meetings, applying the custom portal infrastructure to specific collections of social science data, modifying our data submission and curation systems to better address requirements of social science data management, and—to be announced shortly—recruiting a Fellow focused on understanding and supporting the needs of social science researchers and data. The Arctic Data Center broadly engages the Arctic research community, and will contribute to the important dialogue surrounding Indigenous data sovereignty through ongoing collaborations with projects such as [ELOKA](https://eloka-arctic.org/) (<https://eloka-arctic.org/>) and the [NNA Community Office](https://nna-co.org/) (<https://nna-co.org/>) that work directly with Indigenous groups. In doing so, we seek to increase awareness and appropriate adoption of open research and data archiving across various social science disciplines, and maintain and promote the [FAIR](https://www.go-fair.org/fair-principles/) (<https://www.go-fair.org/fair-principles/>) (Findable, Accessible, Interoperable, and Reusable) and [CARE](https://www.gida-global.org/care) (<https://www.gida-global.org/care>) (Collective Benefit, Authority to Control, Responsibility, and Ethics) principles.

In support of open science and capacity for good data management practices in the Arctic community, we are excited to be able to double the number of training offerings across the next 5 years. Our investment in training Arctic researchers includes not only increased delivery of training events, but also an expanded curriculum with materials planned for development that focus on managing sensitive data, qualitative data, Indigenous Knowledge, co-production, and CARE principles (among others). We welcome community input on these topics and will be reaching out repeatedly during the course of the award as we develop new curricula.

Community input is critical to the strategic direction of the Arctic Data Center and ensuring that we continue to meet the needs of the community. Through engagement at conferences, feedback from researchers using our services, community workshops, and training activities we stay connected with the challenges and opportunities encountered by Arctic researchers. In addition, the Arctic Data Center Science Advisory Board provides advice and leadership on goals and strategic priorities, and supports evaluation of the Center's deliverables and services. The current board brings together expertise in atmospheric, social, terrestrial, oceanographic, earth, and environmental sciences and as part of a planned rotation, we have an open call for nominations to the [Science Advisory Board](https://arcticdata.io/science-advisory-board/) (<https://arcticdata.io/science-advisory-board/>). We value your role in facilitating the success of the Arctic Data Center as a community resource and encourage you to nominate yourself or a colleague to serve on the advisory board.

Full details about the NSF Arctic Data Center partners, leadership, and scientific advisory board can be found on the [Arctic Data Center's website](https://arcticdata.io/) (<https://arcticdata.io/>)

Acknowledgements

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Jasmine Lai is a Projects Data Coordinator at the Arctic Data Center. She has a bachelor of science from the University of British Columbia. At the Arctic Data Center, Jasmine helps archive research data and contributes to open source software. Through her work, she hopes to make science open, inclusive and accessible to a wide audience.



Amber E Budden is Director of Learning and Outreach at the National Center for Ecological Analysis and Synthesis, and co-PI of the Arctic Data Center. Amber leads data science training activities within the NCEAS Learning Hub and supports users of data infrastructure through community building, training, and user-focused design. Amber holds a PhD in Behavioral Ecology and a joint BSc in Psychology and Zoology.



Matthew B. Jones is Director of Research and Development at the National Center for Ecological Analysis and Synthesis, and PI of the Arctic Data Center. Matt's work focuses on both supporting efficient synthesis through scientific computing and on building new advanced infrastructure to support data sharing, preservation, analysis, and modeling.

“Proper Engagement” in Arctic Research

By: *Kaare Sikuaq Erickson, Principal of Ikaagun Engagement*

What does “proper engagement” between Arctic researchers and Indigenous communities mean in 2021? The context of the situation is extremely important. The COVID-19 pandemic has brought Arctic research, and its heavy reliance on domestic and international travel, to its knees. This is an opportunity for reflection and hopefully a turn towards utilizing more local community resources in the Arctic (Petrov et al. 2020). With all the uncertainties surrounding Arctic research in the past year, it is vital that we remember some obvious, but particularly important, guidelines that many in our field are obligated to follow.

I know, I am preaching to the choir; you have heard this many times already. However, we cannot overstate how important it is for everyone involved in US federally funded Arctic research (e.g., researchers, supporting contractors, funders, all of us!) to stop and look in the mirror and ask ourselves how our research and operations are guided by the following five core values:

1. Be Accountable
2. Establish Effective Communication
3. Respect Indigenous Knowledge and Cultures
4. Build and Sustain Relationships
5. Pursue Responsible Environmental Stewardship

These core values were written in 2018 by the [Interagency Arctic Research Policy Committee \(IARPC\)](https://www.iarpccollaborations.org/) (<https://www.iarpccollaborations.org/>), an aggregation of the 14 US federal agencies who fund research operations in the Arctic. Barriers such as wide geographical and cultural gaps, the temporality of project funding, uncertainty due to travel restraints, and other logistical issues can make it exceedingly difficult for scientists and supporting contractors in Arctic research to fully demonstrate and convert these values into practice. However, a genuine effort to embody the core values, regardless the situation, is needed. It is crucial for all of us to understand what the funding agencies and local communities in the Arctic are expecting of Arctic research. If you need additional guidance on the principles and core values, the National Science Foundation (NSF) and IARPC provide [accessible elaboration](https://www.iarpccollaborations.org/principles.html) (<https://www.iarpccollaborations.org/principles.html>).



Northern lights over the community of Shishmaref in spring 2021. Image courtesy of Kaare Sikuaq Erickson.

To further appreciate the context of Arctic research in 2021, we need to also recognize that pandemics have had devastating impacts on most of our families and communities in the Arctic. For instance, nine out of 24 villages in the Bering Straits region lost $\frac{1}{2}$ or more of their populations during the 1918–1919 influenza epidemic (Mamelund et al. 2013). This history, locally referred to as “the Great Death,” (Napolean 1991) set the stage for the way Arctic communities reacted to the COVID-19 pandemic. This context will continue to impact how Arctic researchers and residents engage with each other. We all need to prepare for permanently elevated travel, health, and safety protocols. Proper engagement is no longer an issue of good will, it is an issue of extreme importance and it might be the answer to the future viability of Arctic research.



Sikuaq's family gathered on the beach. Image courtesy of Kaare Sikuaq Erickson.

Within Arctic research, there is also a “capacity building” dilemma that negatively affects engagement between researchers and residents in two main areas. First, due to funding constraints, a majority of Arctic research funding is prohibited from investing in physical infrastructure in Arctic communities. Coincidentally, this infrastructure is exactly what locals need to build the capacity to support and fully engage with Arctic research projects. Quickly building up infrastructure in the Arctic is nothing new. For example, the relatively immediate construction of the former 63 DEW Line sites in the 1950s by the US and Canada required the importation of 918 million pounds of materials to build the infrastructure (Lackenbauer et al. 2005). The second area of concern in reference to capacity building is that increased funding opportunities, in addition to calls for interdisciplinary projects, have resulted in the development of a large cohort of newcomers within Arctic research (both researchers and contractors) who need additional required orientation to help prepare and educate them on how to properly engage with Arctic communities. These types of relevant resources can be extremely hard to find.

So, what does “proper engagement” between Arctic residents and Arctic researchers mean in 2021 and beyond? The answers are many. The polysemous nature of “proper engagement” is due to the extreme natural, geographical, social, and economic variability in the Arctic and in Arctic research. This requires each research project, initiative, program, and endeavor that plans to work in, near, or with local and Indigenous communities to tailor their projects—not just travel plans—to serve the mutual expectations and needs of the funders and the Indigenous communities. One can start by reflecting on how their projects and operations value and demonstrate the guidelines mentioned at the beginning of this text.

Has everyone in Arctic research always followed the IARPC guidelines? *No*. Will all people in Arctic research follow the guidelines in the future? *No*. However, in 2021 we all *need* to be accountable to the Arctic communities we work in and near. We *need* to establish effective communication. We *need* to do everything we can to build and sustain relationships with local communities. We *need* to pursue responsible environmental stewardship. Last and certainly not least, every one of us *needs* to make an honest effort to respect Indigenous Knowledge and Arctic cultures. All of us in Arctic research should stop and take serious consideration of what “proper engagement” with Indigenous communities means to each of us. The reflection is necessary, and the time is pivotal.

For further information, please go to: Ikaagun.com

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About the Author



Kaare Ray Sikuaq Erickson is the Principal and team lead for Ikaagun Engagement, based in Unalakleet and Anchorage, Alaska. Sikuaq was raised on the Bering Sea coast and has family scattered across northern Alaska from Unalakleet to Shishmaref to Utqiagvik. Sikuaq was taught to provide for his communities through subsistence and leadership; to be aware of problems facing Arctic communities; and to find creative, realistic, and effective ways to alleviate or solve those issues. Sikuaq spent nearly two decades immersed in cultural studies and has most recently spent several years developing and implementing creative, effective, and efficient outreach, engagement and K-12 education programs for high profile Arctic research projects. Sikuaq's unique upbringing and specialized training allows him to successfully fulfill his role as cultural broker connecting Arctic communities and Arctic research entities.

Beaufort Gyre Freshwater: Understanding how a Release of the Largest Arctic Ocean Freshwater Reservoir Could Impact the North Atlantic

By: Jiaxu Zhang, Cooperative Institute for Climate, Ocean, and Ecosystem Studies, University of Washington and NOAA Pacific Marine Environmental Laboratory; Wilbert Weijer, Los Alamos National Laboratory; Michael Steele, Polar Science Center, Applied Physics Lab, University of Washington; and Wei Cheng, Cooperative Institute for Climate, Ocean, and Ecosystem Studies, University of Washington and NOAA Pacific Marine Environmental Laboratory

The Arctic Ocean, which is the freshest ocean in the world, is getting even fresher with the changing climate. This is because the Russian and North American rivers draining to the north are increasing their input. In addition, the relatively fresh ocean waters that flow north through the Bering Strait from the North Pacific Ocean are getting fresher. Eventually, this freshwater (both liquid ocean water and solid sea ice) finds its way south into the North Atlantic Ocean via the complex passageways of the Canadian Arctic Archipelago and also through Fram Strait northeast of Greenland. But how and where this water will flow into the Atlantic Ocean, and what ocean-cryosphere feedbacks are invoked as a result, is not well understood.

Starting in October 2018, a collaborative project entitled, "Arctic freshwater pathways and their impact on North Atlantic deep water formation in a hierarchy of models," conducted by University of Washington and Los Alamos National Laboratory scientists and funded by the National Oceanic and Atmospheric Administration (NOAA) Climate Program Office's Climate Variability & Predictability and the Department of Energy's Earth and Environmental System Modeling Program, was launched to dig into the problem. The goal is to investigate freshwater pathways—both oceanic and ice—between the Arctic and subpolar North Atlantic, their controlling mechanisms, and interactions with the Atlantic Meridional Overturning Circulation (AMOC)—that great flow of surface water moving northward that overturns in the North Atlantic and heads south again at great depth. The project utilizes numerical modeling techniques developed at the Los Alamos National Laboratory, as well as available observational data.

The team has been focusing on the Beaufort Sea, the Arctic Ocean's largest freshwater reservoir, which has increased its freshwater content by 40% over the last two decades. A study led by Dr. Jiaxu Zhang, and published in February 2021's issue of *Nature Communications* (<https://www.nature.com/articles/s41467-021-21470-3>), aimed to understand what the potential implications of a rapid release of this Beaufort Sea freshwater may be by looking at historical episodes in which large amounts of freshwater were released.

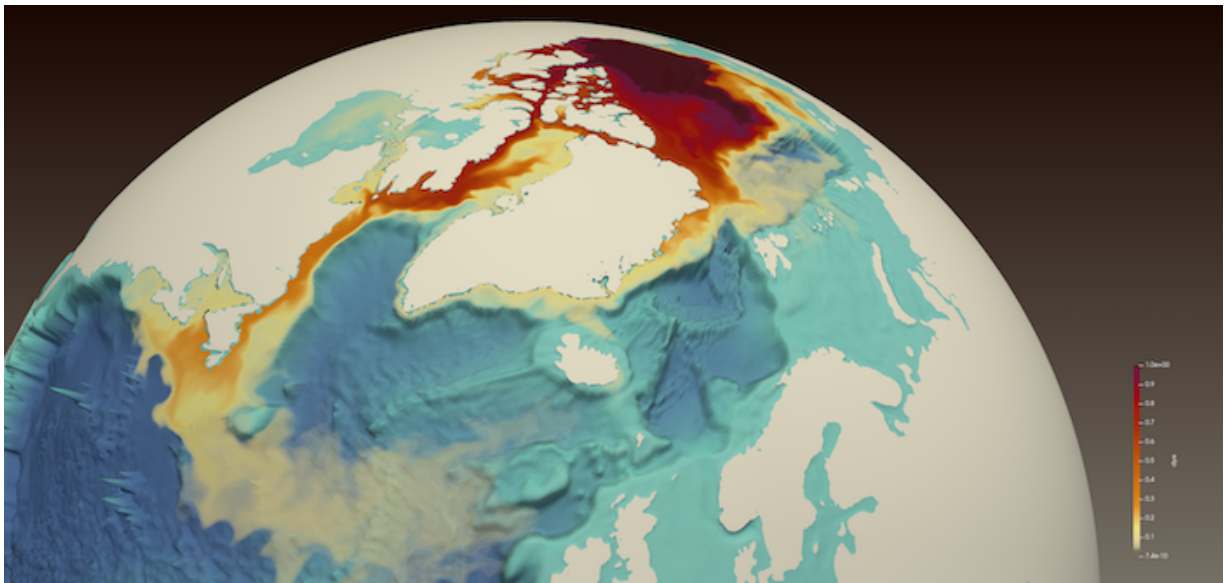


Figure 1. A simulated red dye tracer released from the Beaufort Gyre in the Arctic Ocean (center top) shows freshwater transport through the Canadian Arctic Archipelago, along Baffin Island to the western Labrador Sea, off the coast of Newfoundland and Labrador, where it reduces surface salinity. At the lower left is Newfoundland (triangular landmass) surrounded by orange color representing fresher water, with Canada's Gulf of St. Lawrence occupied by weaker freshening. Image courtesy of Francesca Samsel and Greg Abram.

The team found that this freshwater travels through the Canadian Arctic Archipelago to reach the Labrador Sea, rather than through the much wider Fram Strait to the Nordic Seas. The authors also found that a strong freshening occurred in the western Labrador Sea shelves during a release event in the 1980s. This freshening is found to be comparable in magnitude with that resulting from Greenland meltwater, which is another important freshwater source of the Labrador Sea.

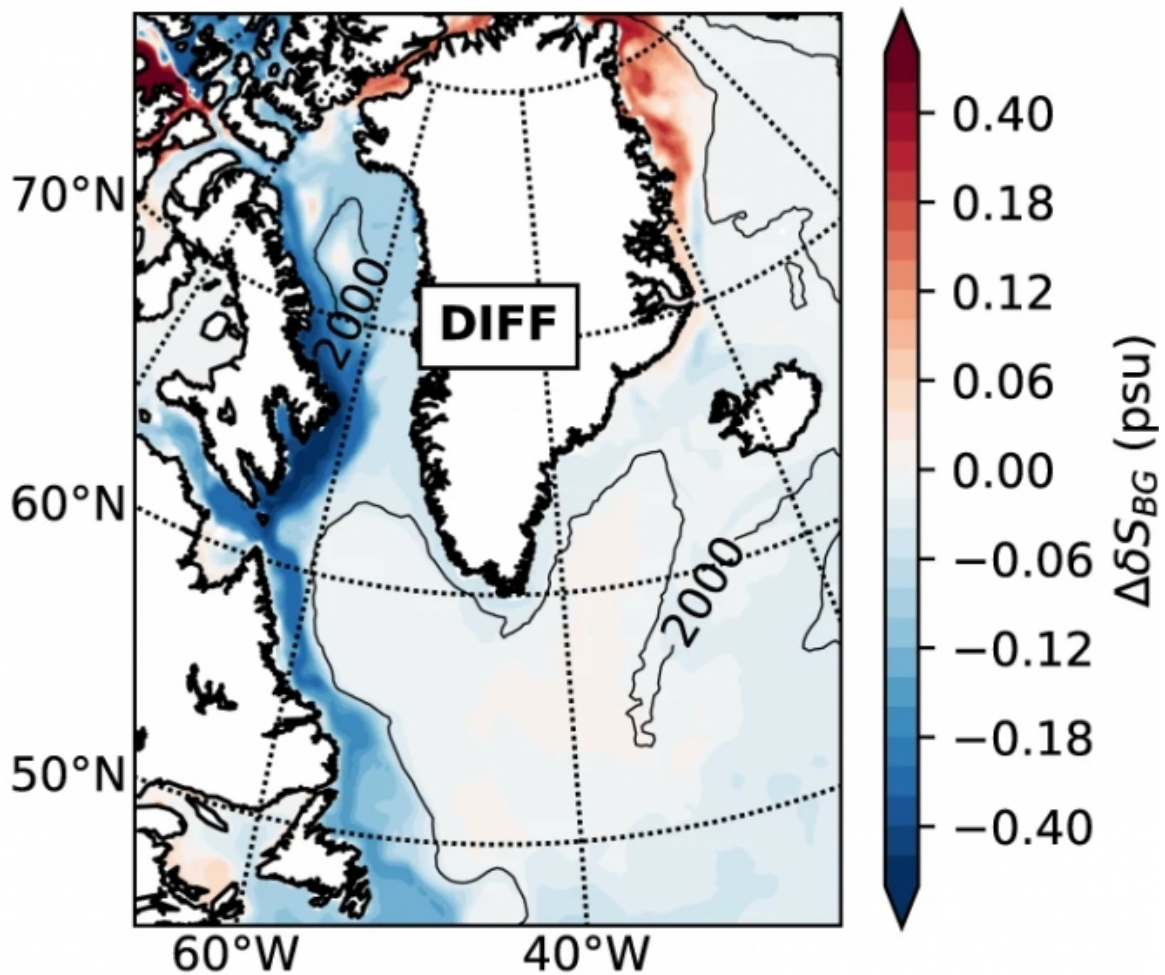


Figure 2. Freshening induced by the Beaufort Sea freshwater. The dark blue corresponds to the strongest freshening induced. The magnitude of freshening is calculated based on the model simulation of a release event in the 1980s and a technique the team developed to track ocean salinity. Figure courtesy of Zhang et al., Nature Communications

The finding has implications for the Labrador Sea marine environment and the shelf ecosystem, since subsurface Beaufort Sea freshwater is rich in nutrients. The freshening found in the western Labrador Sea shelves could also affect the AMOC, because relatively fresh water tends to float on top of the saline water, making it harder to sink. However, the exact effect was not studied and is still unknown.

The AMOC is decreasing and has recently been found to be weaker than at any point in the last 1,000 years. Changes in this flow would significantly impact the European weather system as well as coastal floodings to the US eastern seaboard. If the AMOC continues to decrease, the consequences would be ominous.

Considering the current Beaufort Sea freshwater storage is abnormally large at more than 23,300 cubic kilometers—twice the size of the historical event studied here—the impact of a future release on Labrador Sea salinity could be significant, easily exceeding perturbation from Greenland meltwater.

The published study focused on past events. Current research is looking at the vertical structure of the Beaufort Sea in detail over a longer period of time, trying to understand where today's freshwater buildup might end up. Two additional topics are under investigation in the project. One is to develop advanced measures of freshwater content for model diagnosis. Another is to explore water mass properties along the OSNAP (Overturning in the Subpolar North Atlantic)

transect and their linkage to AMOC variability. Through the research portfolio, the team aims to build a better understanding of the processes that teleconnect the Arctic Ocean with the North Atlantic Ocean in a rapidly changing climate.

Citations

Zhang, J., Weijer, W., Steele, M., Cheng W., Verma T., Veneziani M. 2021. Labrador Sea freshening linked to Beaufort Gyre freshwater release. *Nature Communications* 12:1229 <https://doi.org/10.1038/s41467-021-21470-3>

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PolarTREC has a Teacher in the Field!

By: Janet Warburton, Education Project Manager, Arctic Research Consortium of the US (ARCUS); and Judy Fahnestock, PolarTREC Project Coordinator, ARCUS

We are excited to announce that in 2021, we are able to support a couple of PolarTREC expeditions!

In May, PolarTREC teacher, Liza Backman, from Brooklyn, New York spent 14 days quarantining in Fairbanks, Alaska and then joined her research team studying the Phenology and Vegetation in the Warming Arctic 2021 expedition at Toolik Field Station. She is working alongside Drs. Steve Oberbauer and Jeremy May monitoring changes of vegetation communities at and around the field station.

Liza will work with the research team at Toolik for the next four weeks. Follow her expedition [here](https://www.polartrec.com/expeditions/phenology-and-vegetation-in-the-warming-arctic-2021) (<https://www.polartrec.com/expeditions/phenology-and-vegetation-in-the-warming-arctic-2021>). On 15 June Liza will be sharing her experience live from the Arctic. To learn more about the research, register for this free [PolarConnect event](https://www.polartrec.com/polar-connect/register) (<https://www.polartrec.com/polar-connect/register>).



Figure 1. Liza Backman stands on the boardwalk while monitoring the MISP (mobile instrumented sensor platform) at Toolik. Photo courtesy of Jeremy May.



Figure 2. Sarah Ansbro (Left) and Liza Backman (Right) collect berry samples during the annual early-season berry survey. Photo taken by Jeremy May.

In June, ARCUS will be sharing expedition research updates through the PolarTREC website for [High Arctic Change 2021](https://www.polar-trec.com/expeditions/high-arctic-change-2021) (<https://www.polar-trec.com/expeditions/high-arctic-change-2021>), a research expedition supported by National Geographic. This expedition is a continuation of PolarTREC alumni and teacher, Mark Goldner's, research experience that started with PolarTREC in 2011. He's returning to Svalbard, Norway with Dr. Julie Brigham-Grette. This expedition will start in late July.



Figure 3. Mark Goldner teaches 7th and 8th Grade Science in Brookline, MA. He is returning to Svalbard this summer with Dr. Julie Brigham-Grette to study the dynamics of glacier systems. Photo courtesy of PolarTREC.

Finally, in September we anticipate PolarTREC teacher, Jon Pazol, heading to Norway to board a ship-based expedition as part of the [Nansen and Amundsen Basins Observational System program](https://www.polartrec.com/expeditions/nansen-and-amundsen-basins-observational-system) (<https://www.polartrec.com/expeditions/nansen-and-amundsen-basins-observational-system>). More details about this expedition are emerging as the season progresses.

For the rest of the PolarTREC educators, their expeditions to both the Arctic and Antarctica continue to be postponed until 2022. To stay informed on new developments, please visit the website and join the [Polar Education List](https://www.arcus.org/education/educationlist/subscribe) (<https://www.arcus.org/education/educationlist/subscribe>) to learn about new resources, lesson plans (including virtual lessons), and the latest news on our program.

About the Authors



Janet Warburton is a Project Manager for the PolarTREC program at the Arctic Research Consortium of the United States (ARCUS). Ms. Warburton has managed the education programs at ARCUS since 2000 and in that time has helped over 180 teachers on research expeditions to the Arctic and Antarctic. Ms. Warburton has lived and worked across the state of Alaska and now lives in Anchorage, Alaska.



Judy Fahnestock joined ARCUS in 2008 and is a Project Coordinator for the PolarTREC program. She holds an MSc in entomology from the University of Maryland, and natural resource degrees from the University of Massachusetts and Paul Smith's College.

NSF Issues Dear Colleague Letter on Efforts to Improve the Inclusion of Local and Indigenous Voices in Arctic Research

Announcement Summarized By: Sara Eckert, NSF Office of Polar Programs Communications Specialist

National Science Foundation (NSF) programs supporting Arctic research greatly appreciate the formal and informal feedback recently provided by local and Indigenous communities and Arctic researchers on how NSF can improve inclusion of local and Indigenous voices, as well as Indigenous Knowledge (IK), in Arctic research. In a recent [Dear Colleague Letter](#) (<https://www.nsf.gov/pubs/2021/nsf21077/nsf21077.jsp>), NSF has outlined immediate actions being taken to support indigenous individuals and organizations.



Immediate Clarifications, Revisions, and Improvements to Arctic Programs

NSF has revised and clarified the Arctic Research Opportunities ([NSF 21-526](#)) (<https://www.nsf.gov/pubs/2021/nsf21526/nsf21526.htm>) and Navigating the New Arctic ([NNA; NSF 21-524](#)) (<https://www.nsf.gov/geo/opp/arctic/nna/index.jsp>) solicitations to highlight ethical conduct of research in the Arctic. The updated solicitations also provide guidance on how to build true collaborations with local and Indigenous peoples in NSF-funded research and education.

NSF has also recently funded a [Community Office for the Navigating the New Arctic Program](#) (https://www.nsf.gov/news/special_reports/announcements/020121.jsp), which is supporting the continued collaboration of Arctic scientists with local and Indigenous organizations and individuals.

Ongoing Outreach and Communication

NSF representatives continue to communicate frequently with local and Indigenous individuals and organizations to better understand their specific needs and potential ways to support more inclusive NSF-funded activities in the Arctic. These conversations have taken place with individual PIs, as well as larger audiences, including dedicated sessions at Arctic-focused and international science conferences.

NSF-wide Efforts

NSF's commitment to improvement in work with Indigenous individuals and organizations is aligned with one of the three pillars of Director Dr. Sethuraman Panchanathan's [vision for NSF](#) (https://www.nsf.gov/news/news_summ.jsp?cntn_id=300793), 'ensuring inclusivity.' In addition, the Office of Polar Programs has created a new subcommittee of its Advisory Committee dedicated to Diversity and Inclusion, which is engaged with the NSF Committee on Equal Opportunities in Science and Engineering (CEOSE). The goal of these activities is to better understand the ongoing opportunities, challenges, and needs to continue to improve diversity, equity, and inclusion for NSF programs.

Resources for PIs and Arctic Communities

To increase the visibility and accessibility of these opportunities to a broader community, NSF has launched a landing page on Arctic Community Engagement ([ACE](https://www.nsf.gov/geo/opp/arctic/ace/)) (<https://www.nsf.gov/geo/opp/arctic/ace/>). This page highlights solicitations and resources encouraging the inclusion of local Arctic communities and Indigenous Knowledge in NSF-funded projects.

NSF recognizes that these efforts are not the endpoint, but rather part of growing momentum toward increasing inclusion and equitable participation in research. NSF plans to continue to evolve procedures to ensure broadened support for equitable local and Indigenous participation in Arctic research projects. Please reach out to ACE@nsf.gov to submit feedback or provide input.

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Department of Defense Announces Establishment of Arctic Regional Center

Editor's note: content for this article is excerpted from the [U.S. Department of Defense News Release \(https://www.defense.gov/Newsroom/Releases/Release/Article/2651852/the-department-of-defense-announces-establishment-of-arctic-regional-center/\)](https://www.defense.gov/Newsroom/Releases/Release/Article/2651852/the-department-of-defense-announces-establishment-of-arctic-regional-center/) on 9 June 2021

Secretary of Defense, Lloyd J. Austin III, has announced the establishment of a new Department of Defense Regional Center, the Ted Stevens Center for Arctic Security Studies. The center will bring increased cooperation on the unique challenges and security concerns related to the Arctic region.



[Defense Department Regional Centers \(https://www.dscamilitary.com/dod-regional-centers-rc\)](https://www.dscamilitary.com/dod-regional-centers-rc) are international academic venues for bilateral and multilateral research, communication, and training with the goal of building strong, sustainable international networks of security leaders. The Ted Stevens Center for Arctic Security Studies will develop collaborative insights with allies and partners.

"The center will support the US Interim National Security Strategic Guidance direction to work with like-minded partners and across the interagency to pool our collective strength and advance shared interests," Secretary Austin said. "It will address the need for US engagement and international cooperation to strengthen the rules-based order in the region and tackle shared challenges such as climate change."

The Ted Stevens Center will provide a new venue to collaborate with our allies and partners to advance shared interests for a peaceful and prosperous Arctic. The Department is currently determining the appropriate location for the center.

End of excerpted text.

Perspective from Marisol Maddox, Arctic Analyst at the Wilson Center's Polar Institute:

Marisol Maddox, an Arctic analyst at the Wilson Center's Polar Institute, observes that the inclusion of climate change in the establishment of the center is significant. She notes that climate change has a tremendous potential to be destabilizing—from thawing permafrost that damages military installations to growing food insecurity to the melting of land-based ice that weakens the Gulf Stream and contributes to sea level rise. "The establishment of the center is an important step toward coordinating the different partners that we need to be engaging for both traditional and non-traditional security threats, such as climate change."

Maddox noted further that it will take time to get the center up and running. "In the meantime, leaders can leverage existing forums, such as the Arctic security roundtable at the Munich Security Conference and the idea for an Arctic Ocean Naval Symposium to increase dialogue and further regional cooperation on shared concerns. We definitely need to have better communication with Russia, because the military risk level has become unacceptably high."

For more information or questions about the Wilson Center and the Polar Institute, please contact Marisol Maddox (Marisol.Maddox@wilsoncenter.org)

About the Contributor



Marisol Maddox is an Arctic analyst at the Polar Institute of the Woodrow Wilson International Center for Scholars and a non-resident research fellow at the Center for Climate and Security. Her research interests include the security and geopolitical implications of actorless threats such as climate change and biodiversity loss, as well as international collaboration opportunities, with a regional focus on the Arctic.

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Highlights from USARC's Arctic Sustainable Energy Research Conference

By: Cheryl Rosa, US Arctic Research Commission Deputy Director

On 20–22 April 2021, the US Arctic Research Commission (USARC) hosted the ARCTIC SUSTAINABLE ENERGY RESEARCH CONFERENCE: Research and community needs in the context of a global energy transition, a free, three-day, virtual conference focused on sustainable energy and energy efficiency research featuring guest speakers and panelists from Alaska and around the world.



Figure 1. Arctic Sustainable Energy Research Conference logo. Image courtesy of USARC.

Objectives of the conference included:

- Investigating links between renewable energy research and climate and energy equity;
- Discussing changes in policy needed to meet climate goals and community needs;
- Providing a forum to share the latest information on sustainable energy research in remote, cold climate communities; and
- Determining sustainable energy research gaps in Arctic and sub-Arctic regions.

These objectives were met via three days of presentations and panel discussions, including Climate, Energy and Community Needs, Buildings and Infrastructure (Efficiency and Distributed Energy Resources), and Sustainability (Technologies and Integration).

How Native American and Alaska Native communities play an important role in energy development:

- Organize for Change
- Build Strategic Relationships
- Develop Strategic Plans
- Acquire Financial Resources
- Recruit Fearless Leadership
- Innovate



Figure 2. A slide from Chris Deschene's presentation: "Native American and Alaska Native community roles in energy development: What is needed to ensure an equitable energy transition?" Chris Deschene, Board Member, National InterTribal Energy Council. Image courtesy of USARC.

There was a strong emphasis on "energy equity" and approaches to expand the inclusion and participation of individuals in underserved communities in renewable energy and energy efficiency projects and decision making. The first day included several keynote addresses from Indigenous representatives working in the energy sector in both Alaska and the lower-48 states. Key takeaways included:

- Inequities (social/economic) facing tribes affect how they can respond to climate change and energy crises;
- Having Indigenous peoples have active and decisive roles in governance/leadership/ownership when it comes to implementing new/renewable energy systems is important to balance energy inequities;
- Meeting people where they are language-wise is important. Language (like legalese, etc.) can be a barrier to communities making informed decisions, having their voices heard, and decisions being made as they intend them to be made;
- Many remote areas of Alaska rely heavily on diesel currently, which contributes heavily to energy insecurity;
- Alaskan energy groups are working to standardize switching to renewable energy in villages to make the process easier and more streamlined. They are also prioritizing creating microgrids and creating and implementing training programs related to renewable energy for those coming from these villages to further minimize costs and involve the communities; and
- Focusing on community-focused/involved solutions is key to lasting and useful implementation.

The two days that followed these keynotes included numerous technical presentations focused on sustainable energy in the Arctic. These presentations are archived for public viewing on the USARC website.

Cosponsors of the conference include the Cold Climate Housing Research Center, the National Renewable Energy Laboratory, the Alaska Native Tribal Health Consortium, and the Alaska Center for Energy and Power.

For more information and to view conference materials and recordings, please visit the conference website at:

www.arctic.gov/arctic-sustainable-energy-research-conference (<http://www.arctic.gov/arctic-sustainable-energy-research-conference>)

About the Author



Dr. Cheryl Rosa, Deputy Director and Anchorage-based Alaska Director of the United States Arctic Research Commission (USARC), is trained as a wildlife veterinarian and wildlife biologist and has worked with subsistence communities on the North Slope and in the Russian Far East on a wide range of studies involving wildlife health and zoonotic disease, marine mammal stranding response, subsistence food safety, and oil spill/offshore discharge research. She is a member of the International Whaling Commission's Scientific Committee, as well as numerous other federal and non-federal boards and steering committees. Presently, she is involved in running USARC's Alaska Rural Water and Sanitation Working Group, the Arctic Renewable Energy Working Group, and the Arctic Mental Health Working Group.

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The International Arctic Science Committee: Supporting Pan-Arctic Research

By: Federica Scarpa, IASC Secretariat Communications Manager

The International Arctic Science Committee ([IASC](https://iasc.info/)) is a non-governmental, international scientific organization, founded in 1990 with a mission of encouraging and facilitating cooperation in all aspects of Arctic research, in all countries engaged in Arctic research, and in all areas of the Arctic region. IASC is a connector—connecting scientists across international, disciplinary, and cultural boundaries and connecting those who do research with those who seek the outcomes of that research. IASC achieves its mission by convening the International Conference on Arctic Research Planning ([ICARP](https://icarp.iasc.info/icarp/)), by organizing annually the Arctic Science Summit Week ([ASSW](https://iasc.info/our-work/assw)) by initiating and supporting research initiatives and workshops via its [Working Groups](https://iasc.info/our-work/working-groups), and via its day-to-day work at the Secretariat. IASC has been an Arctic Council Observer since 1998, and it will continue its close scientific cooperation especially via the Arctic Council Working Groups.



Figure 1. Research scientists in the field on Svalbard, Norway. Photo courtesy of K. Greñ.

Arctic Science Summit Week/International Conference on Arctic Research Planning

IASC organizes annually the Arctic Science Summit Week (ASSW) to provide opportunities for international coordination, collaboration, and cooperation in all areas of Arctic science. ASSWs are hosted among IASC member countries. In 2021, IASC launched its new [ASSW website](https://assw.info/) (<https://assw.info/>), a unique website for all upcoming ASSWs, with information on past summits and all relevant news. The latest ASSW, hosted by Portugal and held online due to the ongoing pandemic, was an incredible success. There was a total of 1,224 participants, 82 scientific sessions, five invited keynote lectures, and the 2020 and 2021 [IASC Medal](https://iasc.info/capacity-building/medal) (<https://iasc.info/capacity-building/medal>) lectures by Sue Moore and Atsumu Ohmura. The next ASSW will be held in a hybrid format in Tromsø, Norway, from 26 March–1 April 2022, in conjunction with the Arctic Observing Summit (AOS) (<https://arcticobservingsummit.org/>). The call for ASSW2022 Business and Community Meetings is open now, via the [ASSW2022 Community Meeting Application form](https://docs.google.com/forms/d/e/1FAIpQLSdFVLFj8MsmK-jzBZy7Hs2_F448bGesQG1mahC_18eXEdxaUA/viewform) (https://docs.google.com/forms/d/e/1FAIpQLSdFVLFj8MsmK-jzBZy7Hs2_F448bGesQG1mahC_18eXEdxaUA/viewform). The deadline for application is 30 September 2021.

The International Conference on Arctic Research Planning (ICARP) (<https://icarp.iasc.info/icarp>) is organized every ten years to identify Arctic science priorities for the next decade and identify key scientific questions. As this is a crucial event for Arctic Science, the work on ICARP IV—planned in 2025—has already started. The outcomes of the previous ICARPs have demonstrated that drawing the attention of the world's researchers to critical problems can result in accelerated progress and far greater achievements than would be possible through uncoordinated efforts. IASC is seeking strong engagement by the Arctic Research Community as a whole in planning and executing ICARP. ICARP IV will be a prime vehicle to initiate planning for the next International Polar Year in 2032–33.

IASC Working Groups: The Core of IASC Scientific Work

The strength of IASC's scientific work is through its five [Working Groups](https://iasc.info/our-work/working-groups) (<https://iasc.info/our-work/working-groups>): Atmosphere (AWG), Cryosphere (CWG), Marine (MWG), Social & Human (SHWG), and Terrestrial (TWG). IASC places great emphasis upon interdisciplinary research, allocating funds for cross-cutting activities (i.e., research projects that involve at least two WGs). Recent examples of a cross-cutting activity involving all WGs are: [Indigenous Methodologies in Collaborative Arctic Science](https://iasc.info/our-work/working-groups/cross-cutting-activities/cross-cutting-funded-projects/730-indigenous-methodologies-in-collaborative-arctic-science) (<https://iasc.info/our-work/working-groups/cross-cutting-activities/cross-cutting-funded-projects/730-indigenous-methodologies-in-collaborative-arctic-science>), aimed at discussing Indigenous methodologies in the environmental and social sciences; the [Race and Systemic Bias Crosscutting Workshop](https://iasc.info/our-work/working-groups/cross-cutting-activities/cross-cutting-funded-projects/697-race-and-systemic-bias-crosscutting-workshop) (<https://iasc.info/our-work/working-groups/cross-cutting-activities/cross-cutting-funded-projects/697-race-and-systemic-bias-crosscutting-workshop>); and [AGORA](https://iasc.info/our-work/working-groups/cross-cutting-activities/cross-cutting-funded-projects/698-agera-a-collaborative-arctic-research-community-assessment-of-interactions-between-global-change-drivers-societies-and-subsystems-through-space-and-time) (<https://iasc.info/our-work/working-groups/cross-cutting-activities/cross-cutting-funded-projects/698-agera-a-collaborative-arctic-research-community-assessment-of-interactions-between-global-change-drivers-societies-and-subsystems-through-space-and-time>), a collaborative Arctic research community assessment of interactions between global change drivers, societies and subsystems through space and time. Discover all IASC activities on the [IASC website](https://iasc.info/) (<https://iasc.info/>) or in the [IASC Bulletins](https://iasc.info/about/publications-documents/bulletin) (<https://iasc.info/about/publications-documents/bulletin>).



Figure 2. A caribou visits the automatic Weather Station located close to Nicolaus Copernicus University Polar Station on Kafføyra, Svalbard, Norway. Photo courtesy of K. Greñ.

State of Arctic Science Report

In July 2020, IASC released its first annual IASC's [2020 State of Arctic Science Report \(SAS\)](https://iasc.info/news/iasc-news/576-iasc-releases-2020-state-of-arctic-science-report) (<https://iasc.info/news/iasc-news/576-iasc-releases-2020-state-of-arctic-science-report>) as a cohesive synthesis of international Arctic research activities and priorities gathered from the Arctic research community. Arctic science is moving faster than ever, and so this report is aimed at Arctic science agencies, Arctic science managers, and Arctic science users, including a wide range of decision-makers and policy-makers, to help all Arctic science stakeholders stay up-to-date on Arctic research. An updated version of SAS is expected in summer of 2021.

Engaging Youth and Indigenous Peoples

Youth and Indigenous peoples' engagement, and capacity building of the next generation of scientists, is among IASC key priorities. Each year, IASC offers Fellowships for Early Career Researchers to join the work of the five IASC WGs. Since 2020, following the recommendations of the IASC Action Group on Indigenous Involvement (AGII), IASC also offers one additional Fellowship per year to an early career Indigenous scientist to join one of its Working Groups. IASC is strongly committed to better involving Indigenous peoples and incorporating Indigenous/Traditional Knowledge into IASC and its activities, and is currently implementing several actions that resulted from the report provided by its AGII.

Know More & Get Involved!

IASC has just launched a brand-new [website](https://iasc.info/) (<https://iasc.info/>) with a new design and structure, where you can explore and learn all about IASC, including its activities, partner news, and much more. Further, on the website you can find contacts of your national representatives, and/or your Working Group representatives, who will guide you on how to get involved with IASC, find collaborators, or how IASC supports Arctic science (if your country is not represented, please contact the Secretariat at info@iasc.info). Another way to engage with IASC and make sure you are up to date with upcoming IASC activities and opportunities is to join the IASC mailing list and/or IASC Facebook group, or to follow the IASC Twitter account.

About the Author

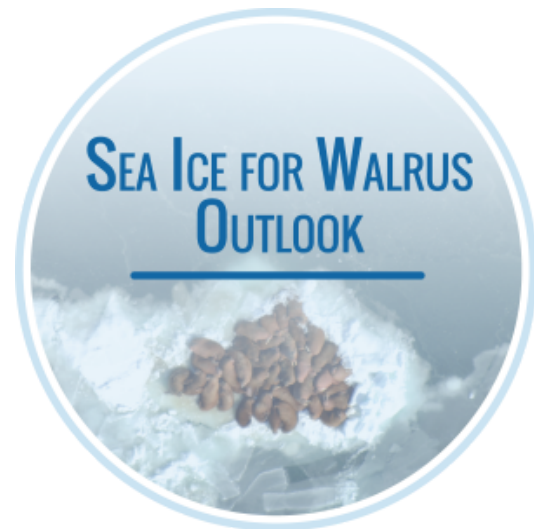


Federica has been IASC Communications Manager since 2017, when the IASC Secretariat moved from Germany to Akureyri, in the North of Iceland. Federica holds a MA in Cultural and Social Anthropology (University of Ca Foscari, 2011) and a MA in Polar Law (University of Akureyri, 2013). Contact: Federica.scarpa@iasc.info

Sea Ice for Walrus Outlook 2021: Alaska Native Sea Ice Experts Share their Observations of Spring in the Bering Sea

By: Lisa Sheffield Guy, ARCUS

The Sea Ice for Walrus Outlook (SIWO) (<https://www.arcus.org/siwo>) is a resource for Alaska Native subsistence hunters, coastal communities, and others interested in sea ice and walrus. The SIWO provides weekly reports during the spring sea ice season with information on weather and sea ice conditions relevant to walrus in the northern Bering Sea and southern Chukchi Sea regions of Alaska. The Outlooks are produced with information on weather and sea ice conditions provided by the National Weather Service - Alaska Region and Alaska Native sea ice experts. SIWO is managed by the Arctic Research Consortium of the U.S. (ARCUS) (<https://www.arcus.org/>), in partnership with the Eskimo Walrus Commission, the National Weather Service, the University of Alaska Fairbanks, and local observers in the communities of Nome, Brevig Mission/Port Clarence, Wales, Shishmaref, Savoonga, Gambell, and Diomedede.



The 2021 SIWO season began on [Friday, 26 March](https://www.arcus.org/siwo/2021-03-26) and ended on [Friday, 18 June](https://www.arcus.org/siwo/2021-06-18), running a total of 13 weeks. All 2021 and past season outlooks are publicly available in the [SIWO Archive](https://www.arcus.org/siwo/archive). Please visit the archive to view full reports with photos from all observers each week. As in recent years, we began the season with a “soft start” for those communities with open water—Savoonga, Gambell, and Brevig Mission (Figure 1). During the first weeks of the season, open water patches and leads shifted with the winds and were not often accessible to hunters, with the exception of the open water polynya on the south side of St. Lawrence Island.

25 March 2021 – Aqef Waghiyi, Savoonga. (<https://www.arcus.org/siwo/2021-03-26>)

There is open water but maybe not enough. When the wind died down the ice came back up a little bit. There's patches of open water here and there. Don't think nobody went boating today. Might take a week for Savoonga. Getting ready to go to south side.

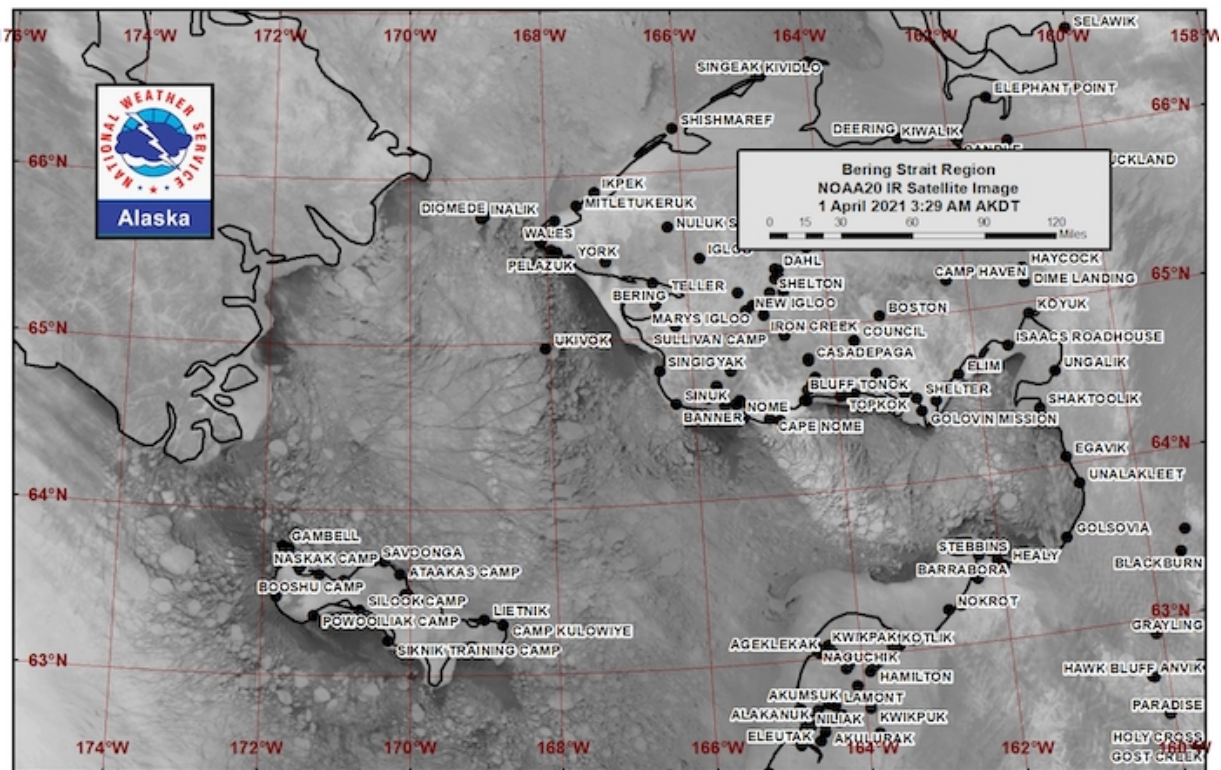


Figure 1. Satellite image of the Bering Strait region on 2 April 2021 provided for the Sea Ice for Walrus Outlook for the second outlook of the 2021 season by the National Weather Service Alaska Sea Ice Program.

The first walrus of the SIWO season were reported by Clarence Irrigoo, Jr. of Gambell on [9 April](https://www.arcus.org/siwo/2021-04-09) (<https://www.arcus.org/siwo/2021-04-09>) and walrus hunting began for this area by [16 April](https://www.arcus.org/siwo/2021-04-16) (<https://www.arcus.org/siwo/2021-04-16>). Open water was first reported in Diomede by Marty Eeleengayouq Ozenna on 12 April, and by [23 April](https://www.arcus.org/siwo/2021-04-23) (<https://www.arcus.org/siwo/2021-04-23>) all communities were reporting areas of open water. The communities of Gambell, Savoonga, and Nome continued to report walrus throughout the month of May (Figures 2 and 3).

20 April 2021 – Robert Tokeinna, Jr., Wales. (<https://www.arcus.org/siwo/2021-04-23>)

Much open water, sea ice seems to be holding off, signs of thawing. Seen sea gulls and some snow birds. Warm past day or two upper 20s to lower teens, brisk 20 mph with mid 30s today. Notice couple fishermen, unsure if they were successful. This was taken about 10 PM Monday, April 19, 2021. (<https://www.arcus.org/siwo/2021-04-23>)

6 May 2021 – Boogles Johnson, Nome. (<https://www.arcus.org/siwo/2021-05-07>)

The sea ice is moving in the Nome area. Our shore fast ice is breaking off closer to the shore, last night there was a piece approx. 6 miles long that just broke off. I was able to head out hunting yesterday and the sea ice is ideal for Walrus & Seals now. We have not had many waves yet so the Pan ice is still mainly in pans. Yesterday was glass calm and a perfect day to be on the ocean. I have heard that several crews have successfully landed Walrus, Oogruk (bearded seals) and seals.



Figure 2. Sea ice and weather conditions in Nome, Alaska on 6 May 2021 courtesy of Sea Ice for Walrus Outlook Observer, Frank (Boogles) Johnson.

14 May 2021 – Clarence Irrigoo, Jr., Gambell. (<https://www.arcus.org/siwo/2021-05-14>)

From May 9–12 boats went out got walrus. May 11 was so foggy but 18-20 boats went out. Most of the boats got walrus. Once when we get to the ice 20+ miles out we see all this. See no more ice, only ice is coming from NE.



Figure 3. Walrus resting on the ice near Gambell, Alaska on 11 May 2021 courtesy of Sea Ice for Walrus Outlook Observer, Clarence Irrigoo, Jr.

Weather conditions—primarily wind and fog—kept hunters off the water during late May. By the first week in June, sea ice was still present in all communities and Curtis Nayokpuk reported hunters preparing to launch boats in shorefast ice open leads (Figure 4).

Friday, 4 June 2021 – Curtis Nayokpuk, Shishmaref. (<https://www.arcus.org/siwo/2021-06-04>)

Inch of fresh new snow on the ground this AM. Only a hand full of Bearded Seals brought in so far by hunters on snow mobiles. Off shore wind (east at 12) combined with new snow cover over thin ice will have hunters preparing boats and gear for hopefully launching along shore fast ice open leads when conditions permit.



Friday, 4 June 2021 – Curtis Nayokpuk, Shishmaref.

By the second week of June, sea ice had disappeared from the communities of Nome and Diomed and the SIWO concluded for those areas. Little ice remained around St. Lawrence Island, though walrus and seals were still present on what remained, and hunters in the Brevig Mission and Port Clarence areas had access to open water and walrus in the area.

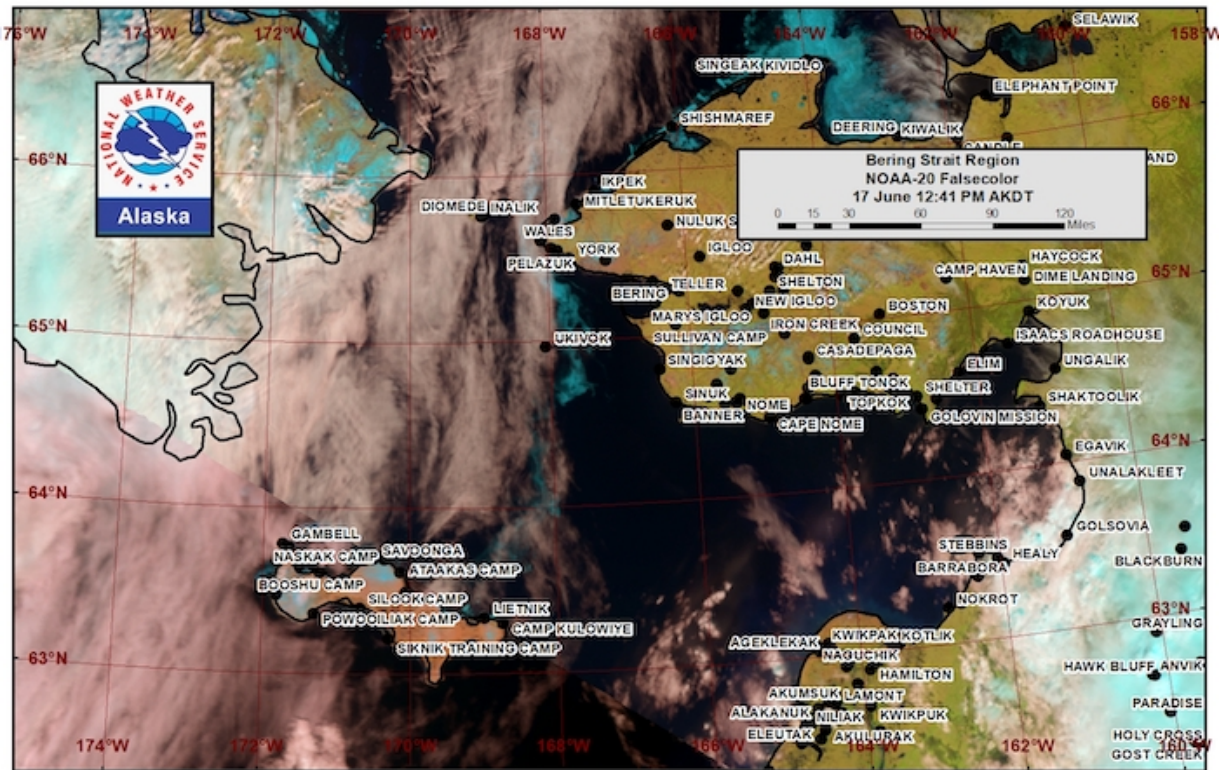
Friday, 11 June 2021 – Marcus Barr (<https://www.arcus.org/siwo/2021-06-11>)

Ice near Brevig went out and hunters are going out boating. I heard of couple boats got walrus but ones that were swimming. More boaters took off yesterday.

The SIWO concluded its 2021 season with a final report for the communities of Savoonga, Shishmaref, and Wales on **18 June** (<https://www.arcus.org/siwo/2021-06-18>), with very little ice left in the area (Figure 5). Curtis Nayokpuk in Shishmaref reported, “This is the first time I’ve seen sea ice (loose pack outer waters) melt before our still solid lagoon! We can’t boat to traditional egg hunting areas yet as lagoon areas blocked with ice.” Also during this final week, Aqef Waghiiyi observed walrus still in the area on the remaining ice about 14 miles north of Savoonga. This year was the latest-running season since 2014, with ice lingering in the region longer than in recent years. While many communities were able to hunt walrus and seals this season, others such as Diomed, were not able to meet community food security needs.

Friday, 11 June 2021 – Marty Eeleengayouq Ozenna (<https://www.arcus.org/siwo/2021-06-11>)

We’ve been pretty ice free and 3 days ago we had 3 pods of killer whales swim and pass by no game been empty like all the game passing along the coast all year barely see any kind of game just birds. Notice around no game swimming by, yet bad year for spring hunting in Diomed, again no meat in the freezers.



Friday, 11 June 2021 – Marcus Barr

During late summer/early fall 2021, a formal evaluation of the SIWO, funded by Alaska Sea Grant, will be led by Dr. Nathan Kettle and Amy Hendricks of University of Alaska Fairbanks. The goal of this evaluation is to examine how well SIWO—now in its twelfth season—has served both Bering Strait coastal communities and others who use SIWO information, and where there might be areas for improvement in future seasons. Results of the evaluation will be shared publicly when available. The next SIWO season is anticipated to begin in March or April 2022. Follow SIWO on [Facebook](https://www.facebook.com/seaiceforwalrus) (<https://www.facebook.com/seaiceforwalrus>) for more discussion of Bering Strait sea ice, weather, and marine mammals year-round.

Thank you to the 2021 SIWO Observers for sharing their observations: Marcus Barr, Native Village of Brevig Mission; Clarence Irrigoo, Jr., Native Village of Gambell; Frank (Boogles) Johnson, Nome Eskimo Community; Curtis Nayokpuk, Native Village of Shishmaref; Marty Eeleengayouq Ozenna, Native Village of Diomedede; Robert Tokeinna, Jr., Native Village of Wales; and Aqef Waghiyi, Native Village of Savoonga.

Funding for SIWO is provided to ARCUS by the National Science Foundation's Division of Arctic Sciences (PLR-1928794).

About the Author



Lisa is a Project Manager for the Arctic Research Consortium of the US (ARCUS) since 2015. Lisa works on a variety of programs at ARCUS, including the Sea Ice for Walrus Outlook, the Arctic Indigenous Scholars Program, The Arctic in the Classroom, and others. Lisa earned BS and MS degrees in Wildlife Science at Oregon State University where she studied seabirds as indicators of climate change on St. Lawrence Island, Alaska. Her professional interests include the impact of changing climate on ecosystems and communities, equitable inclusion of Indigenous Knowledge in science, science communication, and marine ecology.

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